

IN THE CLAIMS:

Please cancel claims 72-101 without prejudice or disclaimer.

Please amend the pending claims as follows:

1. (Currently Amended) An electronic musical instrument control system comprising:

a keyboard comprising a plurality of keys, wherein each key of said plurality of keys is physically displaceable within a key travel range;

a separate key position sensor associated with each key of said plurality of keys, wherein each key position sensor of said plurality of key position sensors responsively provides a key displacement signal corresponding to the position of an associated key within said key travel range; and

at least one displacement sensor interface for receiving said key displacement signals from at least one of said plurality of key position sensors, wherein said at least one displacement sensor interface responsively generates an individual output control signal for each key displacement signal received at said at least one displacement sensor, and wherein each output control signal generated by said at least one displacement sensor is adapted to provide control of sounds generated by an electronic musical system; system.

a separate surface sensor associated with each key of said plurality of keys, wherein each surface sensor of said plurality of surface sensors responsively generates multi-parameter sensor signals corresponding to user contact of an associated key of said plurality of keys; and

at least one surface sensor interface for receiving said multi-parameter sensor signals from at least one surface sensor of said plurality of surface sensors, wherein said at least one surface sensor interface responsively generates a multi-parameter surface sensor output control signal for each multi-parameter sensor signal received at said at least one surface sensor interface, and wherein each multi-parameter surface sensor output control signal generated by said at least one surface sensor interface is adapted to further provide control of sounds generated by said electronic musical system.

2. (Original) The control system according to claim 1, wherein an output control signal associated with at least one key of said plurality of keys is adapted to provide volume control of a synthesized sound generated by said electronic musical system, wherein said volume control is obtained by varying the location of said at least one key within said key travel range.

3. (Original) The control system according to claim 1, wherein an output control signal associated with at least one key of said plurality of keys is adapted to provide timbre control of a synthesized sound generated by said electronic musical system, wherein said timbre control is obtained by varying the location of said at least one key within said key travel range.

4. (Cancelled)

5. (Currently Amended) The control system according to claim 1 claim 4,
said control system further comprising:

a signal processor coupled to said at least one displacement sensor interface and said at least one surface sensor interface, wherein said signal processor responsively generates an outgoing unified control signal based upon individual or selected combinations of output control signals generated by said at least one displacement sensor interface and said at least one surface sensor interface.

6. (Currently Amended) The control system according to claim 1 claim 4,
wherein each key of said plurality of keys provides for the control of at least three independent, substantially continuous parameters, wherein said at least three independent, substantially continuous parameters are controlled using output control signals generated by said at least one displacement sensor interface and said at least one surface sensor interface.

7. (Currently Amended) The control system according to claim 1 claim 4,
wherein each surface sensor associated with each key of said plurality of keys comprises a pressure sensor.

8. (Currently Amended) The control system according to claim 1 claim-4, wherein each surface sensor associated with each key of said plurality of keys comprises a null contact sensor.

9. (Original) The control system according to claim 6, wherein said at least three independent, substantially continuous parameters, for at least one key of said plurality of keys, are adapted to control filter formants of sounds generated by said electronic musical system.

10. (Original) The control system according to claim 9, wherein said filter formants are used to control vowel synthesis of sounds generated by said electronic musical system.

11. (Original) The control system according to claim 6, wherein said at least three independent, substantially continuous parameters, for at least one key of said plurality of keys, are adapted to control sounds generated by said electronic musical system, wherein said sounds are generated using a timbre-space model.

12. (Original) The control system according to claim 11, wherein said timbre-space model is accomplished using volume cross-fading.

13. (Original) The control system according to claim 11, wherein said timbre-space model is accomplished using morphable numerical instrument models.

14. (Original) The control system according to claim 7, wherein each key of said plurality of keys provides for the control of at least four independent, substantially continuous parameters, wherein said at least four independent, substantially continuous parameters are controlled using output control signals generated by said at least one displacement sensor interface and said at least one surface sensor interface.

15. (Currently Amended) The control system according to claim 1 ~~claim 4~~, wherein each surface sensor associated with each key of said plurality of keys includes a pressure sensor formed with sensor mini-array chips.

16. (Currently Amended) The control system according to claim 1 ~~claim 4~~, wherein each key of said plurality of keys provides per-key modulation control of long-duration notes using output control signals generated by said at least one displacement sensor interface and said at least one surface sensor interface.

17. (Original) The control system according to claim 1, wherein one or more pre-determined values of said key displacement signal associated with at least one key of said plurality of keys trigger the generation of particular synthesizer sounds by said electronic musical system.

18. (Original) The control system according to claim 1, said control system further comprising:

a control signal generator for generating a physical restoring force signal for each key of said plurality of keys, wherein each physical restoring force signal of said plurality of physical restoring force signals is generated based upon a corresponding key displacement signal generated in response to the position of an associated key within said key travel range, wherein said physical restoring force signal identifies an amount of necessary force to provide a desired level of tactile feedback for said associated key; and

a restoring force actuator coupled to each key of said plurality of keys, wherein said restoring force actuator responsively provides said desired level of tactile feedback in response to an associated physical restoring force signal generated by said control signal generator.

19. (Original) The control system according to claim 1, wherein each output control signal of said plurality of individual output control signals comprise signals of MIDI format.

20. (Currently Amended) A method for controlling an electronic musical instrument, said method comprising:

providing a keyboard comprising a plurality of keys, wherein each key of said plurality of keys is physically displaceable within a key travel range;

associating a separate key position sensor with each key of said plurality of keys, wherein each key position sensor of said plurality of key position sensors responsively provides a key displacement signal corresponding to the position of an associated key within said key travel range; and

receiving said key displacement signals from at least one of said plurality of key position sensors using at least one displacement sensor interface, wherein said at least one displacement sensor interface responsively generates an individual output control signal for each key displacement signal received at said at least one displacement sensor, and wherein each output control signal generated by said at least one displacement sensor is adapted to provide control of sounds generated by an electronic musical system; system.

associating a separate surface sensor with each key of said plurality of keys, wherein each surface sensor of said plurality of surface sensors responsively generates multi-parameter sensor signals corresponding to user contact of an associated key of said plurality of keys; and

receiving said multi-parameter sensor signals from at least one surface sensor of said plurality of surface sensors using at least one surface sensor interface, wherein said at least one surface sensor interface responsively generates a multi-parameter surface sensor output control signal for each multi-parameter sensor signal received at said at least one surface sensor interface, and wherein each multi-parameter surface sensor output control signal generated by said at least one surface sensor interface is adapted to further provide control of sounds generated by said electronic musical system.

21. (Original) The method according to claim 20, wherein an output control signal associated with at least one key of said plurality of keys is adapted to provide volume control of a synthesized sound generated by said electronic musical system, wherein said volume control is obtained by varying the location of said at least one key within said key travel range.

22. (Original) The method according to claim 20, wherein an output control signal associated with at least one key of said plurality of keys is adapted to provide timbre control of a synthesized sound generated by said electronic musical system, wherein said timbre control is obtained by varying the location of said at least one key within said key travel range.

23. (Cancelled)

-24. (Currently Amended) The method according to claim 20 ~~claim 23~~, said method further comprising:

coupling a signal processor to said at least one displacement sensor interface and said at least one surface sensor interface, wherein said signal processor responsively generates an outgoing unified control signal based upon individual or selected combinations of output control signals generated by said at least one displacement sensor interface and said at least one surface sensor interface.

25. (Currently Amended) The method according to claim 20 ~~claim 23~~, wherein each key of said plurality of keys provides for the control of at least three independent, substantially continuous parameters, wherein said at least three independent, substantially continuous parameters are controlled using output control signals generated by said at least one displacement sensor interface and said at least one surface sensor interface.

26. (Currently Amended) The method according to claim 20 ~~claim 23~~, wherein each surface sensor associated with each key of said plurality of keys comprises a pressure sensor.

27. (Currently Amended) The method according to claim 20 ~~claim 23~~, wherein each surface sensor associated with each key of said plurality of keys comprises a null contact sensor.

28. (Original) The method according to claim 25, wherein said at least three independent, substantially continuous parameters, for at least one key of said plurality of keys,

are adapted to control filter formants of sounds generated by said electronic musical system.

29. (Original) The method according to claim 28, wherein said filter formants are used to control vowel synthesis of sounds generated by said electronic musical system.

30. (Original) The method according to claim 25, wherein said at least three independent, substantially continuous parameters, for at least one key of said plurality of keys, are adapted to control sounds generated by said electronic musical system, wherein said sounds are generated using a timbre-space model.

31. (Original) The method according to claim 30, wherein said timbre-space model is accomplished using volume cross-fading.

32. (Original) The method according to claim 30, wherein said timbre-space model is accomplished using morphable numerical instrument models.

33. (Original) The method according to claim 26, wherein each key of said plurality of keys provides for the control of at least four independent, substantially continuous parameters, wherein said at least four independent, substantially continuous parameters are controlled using output control signals generated by said at least one displacement sensor interface and said at least one surface sensor interface.

34. (Currently Amended) The method according to claim 20 ~~claim 23~~, wherein each surface sensor associated with each key of said plurality of keys includes a pressure sensor formed with sensor mini-array chips.

35. (Currently Amended) The method according to claim 20 ~~claim 23~~, wherein each key of said plurality of keys provides per-key modulation control of long-duration notes using output control signals generated by said at least one displacement sensor interface and said at least one surface sensor interface.

36. (Original) The method according to claim 20, wherein one or more predetermined values of said key displacement signal associated with at least one key of said plurality of keys trigger the generation of particular synthesizer sounds by said electronic musical system.

37. (Original) The method according to claim 20, said method further comprising:

generating a physical restoring force signal for each key of said plurality of keys using a control signal generator, wherein each physical restoring force signal of said plurality of physical restoring force signals is generated based upon a corresponding key displacement signal generated in response to the position of an associated key within said key travel range, wherein said physical restoring force signal identifies an amount of necessary force to provide a desired level of tactile feedback for said associated key; and

coupling a restoring force actuator to each key of said plurality of keys, wherein said restoring force actuator responsively provides said desired level of tactile feedback in response to an associated physical restoring force signal generated by said control signal generator.

38. (Original) The method according to claim 20, wherein each output control signal of said plurality of individual output control signals comprise signals of MIDI format.

39. (Original) An electronic musical control system comprising:

a musical keyboard comprising a plurality of keys;

a separate surface sensor associated with each key of said plurality of keys, wherein each surface sensor of said plurality of surface sensors responsively generates multi-parameter sensor signals corresponding to user contact of an associated key of said plurality of keys; and

at least one surface sensor interface for receiving said multi-parameter sensor signals from at least one surface sensor of said plurality of surface sensors, wherein said at least one surface sensor interface responsively generates a multi-parameter surface sensor output control signal for each multi-parameter sensor signal received at said at least one surface sensor interface, and wherein each multi-parameter surface sensor output control signal generated by said at least one surface sensor is adapted to provide control of sound generated by an electronic

musical system.

40. (Original) The control system according to claim 39, wherein an output control signal associated with at least one key of said plurality of keys is adapted to provide volume control of a synthesized sound generated by said electronic musical system.

41. (Original) The control system according to claim 39, wherein an output control signal associated with at least one key of said plurality of keys is adapted to provide timbre control of a synthesized sound generated by said electronic musical system.

42. (Original) The control system according to claim 39, said control system further comprising:

a key switch associated with each key of said plurality of keys, wherein each key switch of said plurality of key switches responsively provides a key switch signal whenever an associated key experiences a threshold level of user contact; and

at least one key switch interface for receiving said key switch signals from said plurality of key switches, wherein said at least one key switch interface responsively generates an individual output control signal for each of said plurality of said key switch signals, and wherein each output control signal of said plurality of individual output control signals is adapted to provide control of sounds generated by said electronic musical system.

43. (Original) The control system according to claim 39, wherein each key of said plurality of keys provides for the control of at least three independent, substantially continuous parameters, wherein said at least three independent, substantially continuous parameters are controlled using output control signals generated by said at least one surface sensor interface.

44. (Original) The control system according to claim 39, wherein each surface sensor associated with each key of said plurality of keys comprises a pressure sensor.

45. (Original) The control system according to claim 39, wherein each surface sensor associated with each key of said plurality of keys comprises a null contact sensor.

46. (Original) The control system according to claim 43, wherein said at least three independent, substantially continuous parameters, for at least one key of said plurality of keys, are adapted to control filter formants of sounds generated by said electronic musical system.

47. (Original) The control system according to claim 46, wherein said filter formants are used to control vowel synthesis of sounds generated by said electronic musical system.

48. (Original) The control system according to claim 43, wherein said at least three independent, substantially continuous parameters, for at least one key of said plurality of keys, are adapted to control sounds generated by said electronic musical system, wherein said sounds are generated using a timbre-space model.

49. (Original) The control system according to claim 48, wherein said timbre-space model is accomplished using volume cross-fading.

50. (Original) The control system according to claim 48, wherein said timbre-space model is accomplished using morphable numerical instrument models.

51. (Original) The control system according to claim 44, wherein each key of said plurality of keys provides for the control of at least four independent, substantially continuous parameters, wherein said at least four independent, substantially continuous parameters are controlled using output control signals generated by said at least one surface sensor interface.

52. (Original) The control system according to claim 39, wherein each surface sensor associated with each key of said plurality of keys includes a pressure sensor formed with

sensor mini-array chips.

53. (Original) The control system according to claim 39, wherein each key of said plurality of keys provides per-key modulation control of long-duration notes using output control signals generated by said at least one surface sensor interface.

54. (Original) The control system according to claim 39, wherein each output control signal of said plurality of individual output control signals comprise signals of MIDI format.

55. (Original) A method for controlling an electronic musical control system, said method comprising:

providing a musical keyboard comprising a plurality of keys;

associating a separate surface sensor with each key of said plurality of keys, wherein each surface sensor of said plurality of surface sensors responsively generates multi-parameter sensor signals corresponding to user contact of an associated key of said plurality of keys; and

receiving said multi-parameter sensor signals from at least one surface sensor of said plurality of surface sensors using at least one surface sensor interface, wherein said at least one surface sensor interface responsively generates a multi-parameter surface sensor output control signal for each multi-parameter sensor signal received at said at least one surface sensor interface, and wherein each multi-parameter surface sensor output control signal generated by said at least one surface sensor is adapted to provide control of sound generated by an electronic musical system.

56. (Original) The method according to claim 55, wherein an output control signal associated with at least one key of said plurality of keys is adapted to provide volume control of a synthesized sound generated by said electronic musical system.

57. (Original) The method according to claim 55, wherein an output control signal associated with at least one key of said plurality of keys is adapted to provide timbre control of a synthesized sound generated by said electronic musical system.

58. (Original) The method according to claim 55, said method further comprising:

associating a key switch with each key of said plurality of keys, wherein each key switch of said plurality of key switches responsive provides a key switch signal whenever an associated key experiences a threshold level of user contact; and

receiving said key switch signals from said plurality of key switches using at least one key switch interface, wherein said at least one key switch interface responsive generates an individual output control signal for each of said plurality of said key switch signals, and wherein each output control signal of said plurality of individual output control signals is adapted to provide control of sounds generated by said electronic musical system.

59. (Original) The method according to claim 55, wherein each key of said plurality of keys provides for the control of at least three independent, substantially continuous parameters, wherein said at least three independent, substantially continuous parameters are controlled using output control signals generated by said at least one surface sensor interface.

60. (Original) The method according to claim 55, wherein each surface sensor associated with each key of said plurality of keys comprises a pressure sensor.

61. (Original) The method according to claim 55, wherein each surface sensor associated with each key of said plurality of keys comprises a null contact sensor.

62. (Original) The method according to claim 59, wherein said at least three independent, substantially continuous parameters, for at least one key of said plurality of keys, are adapted to control filter formants of sounds generated by said electronic musical system.

63. (Original) The method according to claim 62, wherein said filter formants are used to control vowel synthesis of sounds generated by said electronic musical system.

64. (Original) The method according to claim 59, wherein said at least three independent, substantially continuous parameters, for at least one key of said plurality of keys,

are adapted to control sounds generated by said electronic musical system, wherein said sounds are generated using a timbre-space model.

65. (Original) The method according to claim 64, wherein said timbre-space model is accomplished using volume cross-fading.

66. (Original) The method according to claim 64, wherein said timbre-space model is accomplished using morphable numerical instrument models.

67. (Original) The method according to claim 60, wherein each key of said plurality of keys provides for the control of at least four independent, substantially continuous parameters, wherein said at least four independent, substantially continuous parameters are controlled using output control signals generated by said at least one surface sensor interface.

68. (Original) The method according to claim 55, wherein each surface sensor associated with each key of said plurality of keys includes a pressure sensor formed with sensor mini-array chips

69. (Original) The method according to claim 55, wherein each key of said plurality of keys provides per-key modulation control of long-duration notes using output control signals generated by said at least one surface sensor interface.

70. (Original) The method according to claim 55, wherein one or more pre-determined values of said key displacement signal associated with at least one key of said plurality of keys trigger the generation of particular synthesizer sounds by said electronic musical system.

71. (Original) The method according to claim 55, wherein each output control signal of said plurality of individual output control signals comprise signals of MIDI format.

Claims 72-101 (Cancelled).